

REMARKS

Responsive to the outstanding Office Action, applicant has carefully studied the Examiner's rejections and the comments relative thereto. Favorable reconsideration of the application is respectfully requested in light of the following detailed arguments.

After amendment, claims 17, 19-22 and 28-43 are pending in this application. In this response, claim 43 has been added. Support for this new claim can be found, at least, on page 3, lines 28-31. It is respectfully submitted that no new matter has been presented in this amendment.

A request for a two month extension of time, with the appropriate fee, has been submitted herewith.

REJECTIONS UNDER 35 USC §103

Claims 17, 19-22 and 28-42 were rejected under 35 USC §103 as being unpatentable over US Patent 4,190,698 to De Boel, and further in view of Varma (Pub WO/2002/024445).

Before discussing the prior art, applicant would like to point out for the Examiner's convenience features of the present invention. The present invention, as defined in amended claim 17, relates to a clear intumescent interlayer produced by drying a clear stable aqueous solution comprising an alkali metal silicate waterglass, a water soluble aluminate and a hydroxy carboxylic acid according to under controlled conditions. The interlayer comprises from 10 to 35% by weight of water.

De Boel discloses a light-transmitting fire screening panel comprising at least one sheet of glass and at least one layer of intumescent material. In the layer a hydrated alkali metal silicate is used as intumescent material and one or more adjuvants selected from: urea, polyhydric alcohol (including glycerine, ethylene glycol and sorbitol), monosaccharide (including glucose), polysaccharide (including starch), sodium phosphate, sodium aluminate, aluminum phosphate, borax, boric acid and colloidal silica.

The Examiner's attention is respectfully directed to column 1, line 62 of De Boel, wherein it is stated that:

In order to reduce the gradient of the time/temperature curve after intumescence has been completed, it is believed suitable to select the adjuvant from: monosaccharides which increase the viscosity of the tumid layer, and sodium phosphate, sodium aluminate, borax, boric acid, aluminum phosphate and colloidal silica which increase the refractiveness of the tumid layer.

It is therefore respectfully submitted that De Boel does not reduce this concept to practice i.e. there are no examples given of an interlayer which comprises any one of these inorganic adjuvants. One skilled in the art, following the teaching of De Boel would add sodium aluminate to a silicate waterglass solution and a white precipitate would thus be formed. The interlayer thus formed is not optically clear and it is not acceptable for use as part of a laminated glazing.

From this, it can be gathered that De Boel teaches the utility of various inorganic adjuvants in silicate based interlayers but does not disclose how to incorporate these additives into an optically clear interlayer.

Claim 17 of the present application is directed to a clear intumescent interlayer comprising silicate aluminate and a hydroxy carboxylic acid wherein the interlayer comprises from 10 to 35% by weight of water. These interlayers are produced by the so called pour and dry method on which a solution having a relatively high content of water is poured onto the surface of a glass sheet and dried under carefully controlled condition so as to produce the interlayer.

Thus, the present invention first comprises selecting an aluminate from the list of inorganic adjuvants which is recited by De Boel. The Applicants have discovered that partial neutralization of the aluminate with a hydroxy carboxylic acid prior to mixing with the silicate waterglass results in the formation of an optically clear interlayer.

The Examiner states that Varma teaches a process for the production of an interlayer which comprises an alkali metal silicate waterglass and a salt of carbonic acid and an alpha hydroxy carboxylic acid which can be citric acid. He argues that it would have been obvious to combine the intumescent interlayer of De Boel with the intumescent interlayer of Varma.

It is submitted that this argument is not justified. One skilled in the art has no reason to regard the disclosure of Varma as relevant to the issue of incorporating an inorganic compound such as sodium aluminate into a silicate based interlayer. Varma teaches that the addition of a salt of a carbonic acid or an alpha hydroxylic carboxylic acid to a silicate based interlayer results in the formation of an interlayer having improved properties (page 2 line 17 of the published PCT application). Varma is silent as to the use of inorganic additives such as those proposed by De Boel. There is no teaching or suggestion for one skilled in the art, outside of the teachings of the present invention, to combine the teachings of Varma with that of De Boel.

Based upon the above, it is respectfully submitted that independent claim 17 distinguishes over the applied art of record.

Newly presented claim 43 specifically incorporates the idea that the sodium aluminate is partially neutralized with the hydroxyl carboxylic acid. This feature is nowhere indicated in the prior art of reference. The Applicants have discovered that this partial neutralization results in the formation of a clear solution which can be combined with a silicate waterglass and dried to form an interlayer of the invention. Therefore, newly presented claim 43 further distinguishes over the applied art of reference.

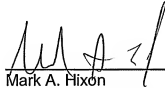
In view of the above it is respectfully submitted that the rejections of the claims under 35 USC §103 have been overcome. Rejection and withdrawal of the pending rejections are therefore respectfully requested.

SUMMARY

For the reasons above, it is submitted that independent claim 17 is allowable over the applied art of record. The remaining claims are believed to be allowable based, at least, upon their dependence from allowable base claims as shown above.

Should the Examiner wish to modify any of the language of the claims, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,



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